In the Claims:

Please amend claims 6, 9, 10, 12-17, 19-22, 28-34, and 36-38.

Please cancel claims 1-5, 7, 8, 11, 23-27, and 35.

Please add new claims 39-45.

1. **(Canceled)**

2. **(Canceled)**

3. **(Canceled)**

4. **(Canceled)**

5. **(Canceled)**

6. **(Currently amended)** The recombinant ~~chimeric~~ inhibitor protein ~~of a protease~~ of claim 39 ~~5~~, wherein ~~characterized in that~~ the kallikrein is ~~an~~ hK2 kallikrein ~~protein~~.

7. **(Canceled)**

8. **(Canceled)**

9. **(Currently amended)** The recombinant ~~chimeric~~ inhibitor protein of ~~a protease of~~ claim 39 ~~8~~, wherein ~~characterized in that~~ the serpin sequence is selected from the group consisting of ~~comprising the~~ α–1antichymotrypsin (ACT), protein C inhibitor (PCI), α–1antiproteinase (AAT), human α–1antitrypsin-related protein precursor (ATR), α–2-plasmin inhibitor (AAP), human anti-thrombin-III precursor (ATIII), protease inhibitor 10 (PI10), human collagen-binding protein 2 precursor (CBP2), protease inhibitor 7 (PI7), protease inhibitor leuserpin 2 (HLS2), human plasma protease C1 inhibitor (C1 INH), monocyte/neutrophil elastase inhibitor (M/NEI), plasminogen activator inhibitor-3 (PAI3), protease inhibitor 4 (PI4), protease inhibitor 5 (PI5), protease inhibitor 12 (PI12), human plasminogen activator inhibitor-1 precursor endothelial (PAI-1), human plasminogen activator inhibitor-2 placental (PAI2), human pigment epithelium-derived factor precursor (PEDF), protease inhibitor 6 (PI6), protease

inhibitor 8 (PI8), protease inhibitor 9 (PI9), human squamous cell carcinoma antigen 1 (SCCA-1), human squamous cell carcinoma antigen 2 (SCCA-2), T4-binding globulin (TBG), Megsin, and protease inhibitor 14 (PI14), fragments thereof, molecular chimeras thereof, combinations thereof, and/~~or~~ variants thereof.

10. **(Currently amended)** The recombinant ~~chimeric~~ inhibitor protein of claim 39 ~~protease of any of the preceding claims~~, wherein ~~characterized in~~ said recombinant ~~chimeric~~ inhibitor protein ~~of a protease~~ is selected from the group consisting of ~~comprising~~ MD820, MD 62, MD 61, MD 67, and MDCI.

11. **(Canceled)**

12. **(Currently amended)** An ~~purified and~~ isolated DNA sequence encoding the recombinant ~~chimeric~~ inhibitor protein of claim 39 ~~of a protease according to any of the preceding claims~~.

13. **(Currently amended)** The ~~purified and~~ isolated DNA sequence of claim 12, wherein said ~~characterized in that the~~ sequence is selected from the group consisting of ~~comprising~~ SEQ ID N° 1, SEQ ID N° 3, SEQ ID N° 5, SEQ ID N° 7, SEQ ID N° 9, SEQ ID N° 11, and SEQ ID N° 13.

14. **(Currently amended)** An expression vector comprising ~~characterized in that it comprises the purified and~~ the isolated DNA sequence of claims 12 ~~to 13~~.

15. **(Currently amended)** The expression vector of claim 14, ~~characterized in that it~~ further comprising ~~comprises~~ a promoter operably linked to the ~~purified and~~ isolated DNA sequence.

16. **(Currently amended)** A eukaryotic or prokaryotic host cell transfected with the expression vector of claim ~~claims~~ 14 ~~or 15~~.

17. **(Currently amended)** A pharmaceutical composition comprising the recombinant ~~characterized in that it comprises a chimeric~~ inhibitor protein ~~of a protease~~ of claim 39 ~~any of claims 1 to 11 as an active agent,~~ and a ~~optionally in combination with one or more~~ pharmaceutically acceptable carriers~~.~~

18. **(Original)** A method of treating or preventing a proteolysis-associated disorder in a mammal comprising administering to said mammal the pharmaceutical composition of claim 17.

19. **(Currently amended)** The method of claim 18, wherein ~~characterized in that~~ the disorder is a disorder in which hK2 kallikrein activity is detrimental.

20. **(Currently amended)** The method of claim ~~18 or~~ 19, wherein ~~characterized in that~~ the disorder is selected from the group consisting of a cancer, an autoimmune disorder, an inflammatory disorder, and ~~or~~ an infectious disorder.

21. **(Currently amended)** The method of claim 20, wherein ~~characterized in that~~ the cancer is selected from the group consisting of prostate cancer, breast cancer, and ~~or~~ a metastasic cancer.

22. **(Currently amended)** The method of claim 20, wherein ~~characterized in that~~ the inflammatory disorder is Benign Prostatic Hypertrophy.

23. **(Canceled)**

24. **(Canceled)**

25. **(Canceled)**

26. **(Canceled)**

27. **(Canceled)**

28. **(Currently amended)** A method for producing the recombinant ~~chimeric~~ inhibitor protein of claim 39 ~~of a protease of claims 1 to 11~~, comprising ~~the steps of~~

a) selecting a polynucleotidic sequence encoding a substrate active ~~enzyme interaction~~ site specific for said Kallikrein ~~a protease~~;

b) introducing said polynucleotidic sequence into a sequence encoding a serpin, so as to obtain a recombinant inhibitor protein ~~an inhibitor protein of a serine or cysteine protease, so as to obtain a chimeric sequence~~;

c) allowing expression of said recombinant inhibitor protein ~~chimeric sequence~~ in a cell expression system under suitable conditions; and

d) ~~and~~ recovering said recombinant ~~the chimeric~~ inhibitor protein ~~of a protease.~~

29. **(Currently amended)** The method of claim 28, wherein ~~characterized in that~~ step a) is performed by phage-displayed library screening.

30. **(Currently amended)** The method of claims 28 ~~and 29~~, ~~characterized in that~~ wherein the suitable conditions comprise ~~consist in~~ culturing the cell expression system at a temperature between 10-40°C during 10-30 hours.

31. **(Currently amended)** The method of claim 30, ~~characterized in that~~ wherein the suitable conditions comprise ~~consist in~~ a temperature of 16°C during 16 hours.

32. **(Currently amended)** The method of claims 28 ~~to 31~~, wherein step d) ~~characterized in that step b)~~ is achieved by separation after extraction of said ~~chimeric~~ recombinant inhibitor protein ~~of a protease~~ from the cell expression system.

33. **(Currently amended)** The method of claim 32, wherein ~~characterized in that~~ the separation of said ~~chimeric~~ recombinant inhibitor protein ~~of a protease~~ is achieved by affinity chromatography.

34. **(Currently amended)** The method of claims 28 ~~to 33~~, wherein ~~characterized in that~~ the ~~chimeric~~ recombinant inhibitor protein ~~of a protease~~ is further assayed for its ability to inhibit the activity of said kallikrein ~~the protease~~.

35. **(Canceled)**

36. **(Currently amended)** The method of claim 28 ~~35~~, wherein the cell expression system ~~characterized in that the prokaryotic cell~~ is a bacterial cell.

37. **(Currently amended)** A diagnostic kit for the detection of a kallikrein ~~protease~~ in a specimen comprising ~~characterized in that it comprises any suitable purified and isolated~~ a DNA sequence selected from the group consisting of ~~comprising~~ SEQ ID N° 1, 3, 5, 7, 9, 11, 13, a sequence complementary thereof, fragments thereof, and/~~or~~ variants thereof.

38. **(Currently amended)** A diagnostic kit for the detection of a kallikrein ~~protease~~ in a specimen comprising ~~characterized in that it comprises a~~ the recombinant ~~chimeric~~ inhibitor protein of claim 39 ~~a protease according to claims 1 to 11~~.

39. **(New)** A recombinant inhibitor protein of a kallikrein comprising a serpin sequence wherein, the Reactive Serpin Loop (RSL) of said serpin sequence is modified by at least one substrate active site sequence, fragments thereof, a molecular chimera thereof, a combination thereof, and variants thereof, specific for said kallikrein.

40. **(New)** A recombinant inhibitor protein of a kallikrein hK2, comprising a serpin sequence, wherein the Reactive Serpin Loop (RSL) of said serpin sequence is modified by at least one substrate active site sequence, fragments thereof, a molecular chimera thereof, a combination thereof, and variants thereof, specific for said kallikrein hK2.

41. **(New)** A recombinant inhibitor protein of a kallikrein, comprising a serpin sequence, wherein the amino acid sequence of the Reactive Serpin Loop (RSL) of said serpin sequence is selected from the group consisting of SEQ ID No 16, 17, 18, 19, 20, 21, and 22, fragments thereof, molecular chimeras thereof, combinations thereof, and variants thereof.

42. **(New)** The recombinant inhibitor protein of claim 39, wherein the at least one substrate active site sequence specific for said kallikrein is a substrate peptide selected by said kallikrein using a phage-displayed random pentapeptide library.

43. **(New)** A chimeric inhibitor protein of a kallikrein comprising a serpin sequence wherein, the Reactive Serpin Loop (RSL) of said serpin sequence is modified by at least one substrate active site sequence, fragments thereof, a molecular chimera thereof, a combination thereof, and variants thereof, specific for said kallikrein.

44. **(New)** A purified and isolated DNA sequence encoding the recombinant inhibitor protein of claim 39.

45. **(New)** A purified and isolated DNA sequence encoding the chimeric inhibitor protein of claim 43.